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SUSTAINABLE SOLID WASTE MANAGEMENT KNOWLEDGE AND PRACTICES AMONG RURAL COMMUNITY IN MALAYSIA

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Abstract

This study aimed to explore the current knowledge and practices of sustainable solid waste management among the rural community in Malaysia. It is becoming a significant concern to promote sustainable practices to the rural community, given that the facilities of solid waste disposal are noticeably lacking in the rural area. Data was gathered through a survey questionnaire in two phases. The first phase of the survey examines the community's current solid waste practices and their knowledge about solid waste management. The second phase gathered the community's level of knowledge about sustainable solid waste management after a briefing and demonstration about composting. A total of 55 respondents from a rural community in northern Malaysia were selected via a convenience sampling method for the purpose of this study. Empirical results show that while the existing knowledge and practices of sustainable solid waste are low among the rural community, their knowledge about sustainable practices improves significantly after the briefing and practical activity. The study conveys some practical implications to the need for environmental awareness and education to promote sustainable practices in managing waste in the rural areas.

Keywords:*solid waste management, rural community, knowledge, sustainability, environmental education*

INTRODUCTION

Today's rate of solid waste generation in Malaysia is alarming, accelerated by the growing population, industrialization and vibrant economic climate (Aslina&Haliza, 2015). Haliza (2016) reported that the disposal rate in the country is approximately 33,000 metric tonnes waste per day in 2013, which contributes to a cost of RM1.2 billion for waste collection, or 60% of the total financial allocation for solid waste management. Consequently, the financial implication to the country is very significant, as the cost to provide the facilities for solid waste is mounting. Malaysia, like many developing countries are still grappling in the issue of solid waste management due to the lack of awareness and how to manage solid waste efficiently (Sabeen, Ngadi& Noor, 2016).Hence, it is clearly evident that the solid waste management posed a great challenge for a country to find sustainable solutions to these issues.

The Solid Waste And Public Cleansing Management Act 2007 defines "solid waste" includes— (a) any scrap material or other unwanted surplus substance or rejected products arising from the application of any process; (b) any substance required to be disposed of as being broken, worn out, contaminated or otherwise spoiled; or (c) any other material that according to this Act or any other written law is required by the authority to be disposed of. In a national study by JPSPN (2012), it was reported that food waste is a major contributor to solid waste composition (13.2%), followed by diapers (12.1%), paper (8.5%),

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garden waste (5.8%), glass (3.3%), textiles (3.1%) and others (9.7%). According to Hasnah et al. (2012), the frequency of solid waste generation is based on several factors affecting the generation of solid waste itself, such as lifestyle, culture, economy, climate, housing and legal factors.

In Malaysia, Solid Waste Corporation (SWCorp) is a body that manages all solid waste from residential, urban and rural areas. However, the success of solid waste management does not depend on a particular agency only, it is also closely dependent on public awareness and willingness to change the behaviour. Specifically, adopting good solid waste management practices, such as reuse, reduce and recycle (3R) has been widely accepted as an effective approach to minimize waste to the landfill (Mongkolnchaiarunya, 2005). Moreover, it is highly a necessary practice in rural areas, where the facilities of solid waste disposal are noticeably lacking. Therefore, improper disposal options such as wild dumps, river dumping or open burning of household waste are more common in rural areas. This scenario is worrying because improper management of solid waste will resulted into a serious environmental pollution, cleanliness and health issues (Janya& Magnus, 2012). Besides, it can cause significant losses in terms of composting, recycling or energy recovery potential (Colón et al., 2010).

Despite these concerns, the awareness of sustainable solid waste practices, such as 3R and home composting is still low among the public (Colón et al., 2010). This is generally a major hindering factor for people to uptake sustainable practices in managing waste, especially in rural areas (Mohamad Satori, Endang, Yanti, Tirani, Neneng, Iik, 2018). Moreover, much has been discussed about sustainable solid waste practices in the urban and industrial context, leaving the understanding of such practices in the rural community, a great ambiguity. Accordingly, the study seeks to address this gap and implicates some practical significance in promoting environmental education to the public at large.

METHODOLOGY AND AIMS

This study pursued a quantitative approach as suggested by Creswell and Clark (2011). The main objectives are twofold; first, the study seeks to identify the current solid waste practices in the community, and second is to assess their level of knowledge acquisition about sustainable solid waste management. The initial objective is achieved through a survey, while the latter incorporates the education approach via briefing and demonstration sessions. In particular, the participants were surveyed on their level of understanding before and after briefing and demonstration session, which conducted by SWCorp. as a third party participating in this study. Accordingly, the questionnaire forms in pre survey were designed to include three main parts; Part A (demographic information), Part B (solid waste management practices) and Part C (knowledge about solid waste management). Meanwhile, the post survey forms only consist of two parts; Part A (demographic information), and Part B (knowledge about solid waste management). The responses utilized tick boxes and Likert scales ranging from 1–5, with 5 indicating strongly agree and 1 strongly disagree. Data were collected during one-day community engagement program with the local solid waste management agency (SWCorp.) at a rural community in the northern state of Malaysia. A total of 55 local residences were invited to participate in the study. Selection of the respondents adopted purposive sampling technique, given the need to have specific characteristics in accomplishing the study (Gay &Airasian 2003), such as the local residence and the reading ability.

RESULTS

Demographic data shows that all the 55 respondents involved are Malay, with 78.19% (43) of them aged above 41 years old. The female respondents consist of 60% of them (33), and mostly already married (85.45%). Besides, the education level is mainly at the secondary level, about 38.18% (21) of them are self-employed and 47.27% (26) have family members more than 5 persons. The findings from pre and

post survey are detailed out as follows.

Solid waste management practices

The corresponding data was captured in the pre survey, as the study intend to explore the community's existing practices in managing waste. Three practices were particularly examined in this study, namely recycling, waste separation and composting.

a. Recycling

it was noted that recycling was not a common practice among 70.9% (39) of the respondents. Indeed, they confessed that low awareness about recycling is the main reason for it. Accordingly, data shows that 60% (33) of them never use the recycling bin, while the main reason is that the recycling facilities were not available in their residential area. Nevertheless, the majority perceived that recycling activity is not a burden, instead, they believe that it is part of their responsibility and offer many benefits.

b. Waste separation

The findings disclosed that this practice was not greatly adopted, given that 90.9% (50) of the respondents never do so. The reasons were due to lack of awareness, which accounted for 80% (44), and also inconveniences towards the practice (89.1%).

c. Composting

Data shows that 74.5% (41) of the respondents did not practice composting. About 47.3% (26) people perceived that composting did not benefit them. Accordingly, the reasons were due to lack of awareness (72.7%) and inconvenience towards the practice (47.2%).

In general, it was found that the level of sustainable solid waste management practices such as recycling, waste separation and composting are still low among the rural community in this study.

Community's level of knowledge about sustainable solid waste management practices

The assessment for this objective utilizes data from both pre and post survey. This allows the researchers to make a comparison of the community's level of knowledge before and after the briefing and demonstration given by the participating agency (SWCorp). The following table demonstrates the community's level of knowledge about sustainable solid waste management practices in the pre and post survey.

Table 1: Mean score comparison of the community's level of knowledge about recycling

		Mean score	
No.	Items	Pre	Post
1.	I know about recycling solid waste.	3.7	4.4
2.	I know about the benefits of recycling	3.9	4.3
3.	I know about the types of materials for recycling	3.8	4.3
4.	I know about the recycling bins/ facilities in my area	3.3	4.1
5.	I know about the recycling programmes in my area	2.0	4.2
6.	I know about recycling schedule in my area	2.1	3.3
7.	I am well informed about recycling	1.9	4.2

8.	I know how to do recycling	3.2	4.3
9.	I know about the respective parties/ agencies that manage the recycling programmes	1.8	3.9

As shown in Table 1, some improvement was noted in the mean score from pre and post survey. This suggests that the community's knowledge about recycling has raised to a higher extent, in terms of method, materials and benefits. Similarly, the results on the community's level of knowledge about waste separation are presented in Table 2.

Table 2: Mean score comparison of the community's level of knowledge about waste separation.

		Mean	
No.	Items	Pre	Post
1.	I know about solid waste separation	3.6	3.9
2.	I know about the benefits of waste separation	3.6	4.1
3.	I am well informed about waste separation	2.5	4.0
4.	I know about waste separation programmes	2.2	3.9
5.	I know about the respective parties/ agencies that organize waste separation programmes	2.3	4.0
6.	I know how to do waste separation	2.0	4.3
7.	I know about the types of waste that could be separated	2.0	4.1

Accordingly, the results convey that the community's level of knowledge about waste separation also increased significantly after the briefing and demonstration activity. In addition, the results with regards to composting practice also noted as described in the following table.

Table 3: Mean score comparison of the community's level of knowledge about composting

		Mean	
No.	Items	Pre	Post
1.	I know about solid waste management through composting	3.3	4.2
2.	I know about the benefits of waste composting	1.9	4.3
3.	I know about waste composting programmes	1.8	4.0
4.	I am well informed about waste composting	2.4	4.0
5.	I know about the types of waste for composting	2.0	4.3
6.	I know how to do waste composting	1.8	4.2
7.	I know about the respective parties/ agencies that organize waste composting programmes	1.8	4.1

Based on table 3, data also confirms consistent results that the level of knowledge about waste composting among the community in this study has been improved after the briefing. Again, it reflects the significant role of environmental awareness programmes in enhancing the knowledge for sustainable waste management practices and educate the people to adopt such practices.

DISCUSSION

The findings demonstrate that sustainable solid waste practices in terms of recycling, waste separation and composting were not largely adopted by the rural community in Malaysia (ranging from 70.9%-90.9% respectively). This fact is considered very discouraging if compared to a similar study by Mohamad Satori et al. (2018) in Indonesia, who discovered that only 38% of the rural community under their investigation had not adopted sustainable solid waste practices.

Likewise, the present study also indicates that existing knowledge about waste management remains limited until they were exposed to some facts during the briefing and demonstration activity. A significant improvement in their knowledge (indicated by the increased mean score in the post survey) suggest that awareness and the educational platform is essential to promote sustainable solid waste practices in the community. Indeed, community participation is a key factor attaining the goal of solid waste management, and it is more crucial in developing countries (Dhokhikah&Trihadiningrum, 2012). Given this issue, substantial attention should be given to educate the rural community about sustainable practices. This could greatly help to address the wild dump issues due to inadequate solid waste facilities in the rural areas, by adopting alternatives such as recycling and home composting (Colón et al., 2010; Mihai&Ingrao, 2016).

Another distinctive finding, this study implies the benefits of community-university-agency nexus in promoting sustainable knowledge to the public. The researchers purposely invited the relevant agency to deliver the talk and educate the community through the practical session, so that the community is trained by the experts in solid waste management. Besides, it also aims to promote knowledge sharing between academics and practitioners in the field of various sustainable techniques. Ultimately, the community also benefiting from the program as their knowledge was enriched by both parties involved. Such an engagement project should be intensified to a greater scale because disseminating environmental knowledge would result in improving the public's attitude toward the environment. Indeed, we agree to Shiel et al. (2016) that universities have a potential role to play in capacity building of the community towards sustainable practices. Furthermore, sustainable practices such as recycling and composting could be a potential source of income generation, thereby enhancing the life quality and economy of the rural community (Kebede, Gan&Kaguchi, 2016).

CONCLUSION

This study sheds some insights about the knowledge and practices of sustainable solid waste practices-recycling, waste separation and composting among the rural community in Malaysia. Notably, the educational approach incorporated during the event of this study has positively resulted in the improvement of the community's knowledge about solid waste management. Empowering the rural community towards sustainable waste practices should start with awareness and education for the people. Consequently, people will realize that such practices would not only benefit the environment, but it could also implicate their living by offering a source of income generation. The insights forwarded by this study suggest the pivotal role of education and awareness program in promoting the sustainable waste practices among the rural community and the public at large.

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REFERENCES

[1] Aslina, I., &Haliza, A. R. (2015). KajianTerhadapPengetahuandanAmalanPengurusanSisaPepejaldalamKalanganMasyarakat di Taman Mesradan Taman Bakti, Kota Bharu, Kelantan. International Conference on Human Sciences, ICHSUPSI 2015, TanjungMalim, Malaysia.

[2] Colón, J., Martínez-Blanco, J., Gabarrell, X., Artola, A., Sánchez, A., Rieradevall, J. & Font, X. (2010). Environmental assessment of home composting. *Resources, Conservation and Recycling*,

54, 893-904.
[3] Dhokhikah, Y., Trihadiningrum, Y., &Sunaryo, S. (2015). Community participation in household solid waste reduction in Surabaya, Indonesia. *Resources, Conservation and Recycling*, *102*, 153–162. https://doi.org/10.1016/j.resconrec.2015.06.013
[4] Gay, L.R., &Airasian, P. (2003). *Educational Research: Competencies for Analysis and Applications*. Edisi ke-7. Ohio: Merrill Prentice Hall.
[5] Haliza, A. R.(2016). Pengurusansisapepejalbandardaripadaperspektifperundangan.Seminar SerantauPengurusanPersekitaran 2016, PuriPujangga, UKM.
[6] Hasnah, A., Dody, D., Noraziah, A., Maznah, I. &Sarifah, Y. (2012). Masyarakatdanamalanpengurusansisapepejalkearahkelestariankomuniti: Kesisirumahwanita di Bandar BaruBangi, Malaysia.*GeografiaOnline™ Malaysia Journal of Society and Space 8*, 5, 64 – 75.
[7] Janya, S. A. & Magnus, B. (2012). *Sustainable Solid Waste Management for Developing Asian Countries: A Case Study of Phitsanulok Municipality, Thailand.* Handbook of Sustainability Management, 555-574.
[8] Kebede, E., Gan, J. &Kaguchi, J.M. (2016). Agriculture based energy for rural household income and well-being: East African experience. Renewable and Sustainable Energy Reviews, 53, 1650-1655. doi: 10.1016/j.rser.2015.07.167
[9] Mihai, F.C. & Ingrao, C. (2016). Assessment of biowaste losses through unsound waste management practices in rural areas and the role of home composting. Journal of Cleaner Production, 172,1631-1638. doi: 10.1016/j.jclepro.2016.10.163.
[10] Mohamad Satori, EndangPrastyaningsih, YantiSrirejeki, TiraniHikmahNurUlfah, Neneng Rika Nurmalasari, IikNuralam (2018). PengolahanSampahOrganikRumahTanggaDenganMetode Bata Terawang.*Ethos:JurnalPenelitiandanPengabdian Masyarakat*, 6, 1, 135-145.
[11] Mongkolnchaiarunya, J. (2005). Promoting a community-based solid waste management initiative in local goverment: Yala Municipality, Thailand. *Habitat International Journal*, 29, 27-40.
[12] Sabeen, A. H., Ngadi, N., & Noor, Z. Z. (2016). Minimizing the cost of municipal solid waste management in PasirGudang Johor Malaysia. *Journal of Materials and Environmental Science*, *7*(5), 1819–1834.
[13] Shiel, C., Filho, W. L., do Paço, A., &Brandli, L. (2016). Evaluating the engagement of universities in capacity building for sustainable development in local communities. *Evaluation and Program Planning*, *54*, 123–134. https://doi.org/https://doi.org/10.1016/j.evalprogplan.2015.07.006
[14] Solid Waste & Public Cleansing Mangement Act. (2007). Retrieved November 25, 2019, from https://jpspn.kpkt.gov.my/resources/index/user_1/Perundangan/Peraturan_PSP&PA/2018/pua_20180731_P.U.(A)_181.pdf